

REMARKS

In response to the Office Action mailed January 5, 2010 (hereinafter “the Office Action”), Applicants respectfully request reconsideration. Claims 1-20 were previously pending for examination. Claims 1, 5, 10, and 20 are herein amended. Claims 21 and 22 are added. Support for the amendments and added claims can be found at least at page 5, fourth paragraph, and page 8, last paragraph – page 9, first paragraph of the application as filed. No claims have been canceled. No new matter has been added. As a result, claims 1-22 are currently pending, with claims 1 and 10 being independent.

Rejection under 35 U.S.C. §112, first paragraph: claims 1-9

At page 3, the Office Action rejects claims 1-9 under 35 U.S.C. § 112, first paragraph, as purportedly failing to comply with the written description requirement. Without acceding to the correctness of the rejection, Applicants have amended claim 1 to remove elements directed to changes in lattice parameters. Withdrawal of the rejection of claims 1-9 is respectfully requested.

Rejection under 35 U.S.C. §112, first paragraph: claims 1-20

The Office Action (beginning at page 3) rejects claims 1-20 under 35 U.S.C. § 112, first paragraph, as purportedly failing to comply with the enablement requirement. In particular, the Office Action states at page 4, “Applicant appears to claim a broad genus of electrochemical cells based on the specification...which only refers to the active material from Examples 1 and 2 (CoS and CoO) and the characteristics found therein. It is therefore, Examiner’s position that one skilled in the art would not be enabled to create the invention...such that the active material exhibits ionic interactions only on external surfaces of the particles of the active material without observable changes to the lattice parameters of the active material.” Applicants respectfully traverse the rejection to the extent it is maintained against the claims as amended.

Without acceding to the correctness of the rejection, Applicants have amended independent claims 1 and 10 to remove elements directed to ionic interactions only on external surfaces of the particles of the active material without observable changes to the lattice parameters of the active material. Reconsideration and withdrawal of the rejection of claims 1-20 is respectfully requested.

Rejection under 35 U.S.C. §112, second paragraph: claims 1-9, 12, and 13

Page 4 of the Office Action rejects claims 1-9 and 12-13 under 35 U.S.C. § 112, second paragraph, as purportedly being indefinite. In particular, the Office Action notes, “The term ‘observable’ in Claim 1 is a relative term which renders the claim indefinite.” Applicants respectfully disagree and traverse this rejection.

Regarding claim 1, without acceding to the correctness of the rejection, Applicants have amended claim 1 to remove elements directed to “observable changes.” Therefore, reconsideration and withdrawal of the rejection of claim 1, and its dependent claims 2-9, is respectfully requested.

Regarding claims 12 and 13, Applicants submit that the term “observable” would reasonably apprise one of ordinary skill in the art of the scope of the invention. In particular, one of ordinary skill in the art would know what methods and instruments are available to observe changes in crystal structure or crystal state, and one of ordinary skill in the art could execute such methods and use such instruments to determine whether changes in crystal structure or crystal state would be present in a device. Since changes in structure and state of a crystal are measurable using instruments and methods known to those skilled in the art, the claim elements “wherein crystal structure of the active material is observably unchanged” and “wherein crystal state of the active material is observably unchanged” as recited in claims 12 and 13 are definite and would reasonably apprise one of ordinary skill in the art of the scope of the invention. Accordingly, reconsideration and withdrawal of the rejection of claims 12 and 13 is respectfully requested.

Rejections Under 35 U.S.C. §103

The Office Action at page 5 rejects claims 1-20 under 35 U.S.C. §103(a) as purportedly being unpatentable over Hoffman et al., (U.S. Patent No. 4,894,302) in view of Mayes et al., (U.S. Patent Publication No. 2002/0048706). In particular, Hoffman is relied on for teachings of a first pole, a second pole, and an ionic conductor. The Office Action acknowledges that Hoffman “fails to teach said active material has an average particle diameter as small as 1 nanometer.” Mayes is then relied on for a teaching of an active material having a particle diameter less than 10 nm in diameter. Applicants respectfully traverse the rejection to the extent it is maintained against the claims as amended.

Claim 1

Claim 1 is directed to an electrochemical device and recites, a first pole comprising “a conductive material comprising a mixture of fine graphite powder and fine carbon powder, the fine carbon powder having particle diameters on the order of nanometers.” Neither Hoffman nor Mayes teaches or suggests “a conductive material comprising a mixture of fine graphite powder and fine carbon powder, the fine carbon powder having particle diameters on the order of nanometers” as recited in claim 1. Hoffman discloses that graphite or carbon (Col. 6, line 6) can be used in making a cathode, but does not teach or suggest a mixture wherein the fine carbon powder has particle diameters on the order of nanometers. Mayes discloses (paragraphs [0024] and [0071]) that carbon black or graphite are used as electronically conductive particles in a cathode, but that the average particle size is “typically on the order of no less than about 100 microns” or “in the 10 to 100 micron range.” Accordingly, Mayes also fails to teach or suggest “a conductive material comprising a mixture of fine graphite powder and fine carbon powder, the fine carbon powder having particle diameters on the order of nanometers.” Since the cited art fails to teach or suggest at least these elements of Applicants’ claim, claim 1 therefore patentably distinguishes over Hoffman and Mayes.

Applicants further submit that modifications to cathodes and/or ionic conductors of electrochemical devices generally yield unpredictable, *i.e.*, non-obvious, results. This is noted by Hoffman. (See column 1, lines 26-36.) In particular, one of ordinary skill in the art, starting with Hoffman and Mayes, would not have been able to predict, for example, the recharging characteristics of Applicants’ device reported in FIGS. 3 and 5 of the application. For example, one of ordinary skill in the art would not have been able to predict with certainty whether the device would have exhibited battery characteristics, or how such a device would perform when a fine carbon powder having particle diameters on the order of nanometers is incorporated into the cathode matrix. It would not be known whether the small particles would be stable in the matrix or exhibit mobility or structural change over time that would adversely or beneficially affect the battery’s performance. For at least these reasons, Applicants submit that claim 1 is non-obvious over Hoffman and Mayes.

In view of the foregoing, claim 1 patentably distinguishes over Hoffman and Mayes. Reconsideration and withdrawal of the rejection of claim 1 under 35 U.S.C. §103(a) is respectfully requested. Claims 2-9 depend from claim 1 and are therefore allowable for at least the same reasons.

Claim 10

Claim 10 is also directed to an electrochemical device and also recites, “a conductive material comprising a mixture of fine graphite powder and fine carbon powder, the fine carbon powder having particle diameters on the order of nanometers.” For reasons that should be clear from the preceding discussion of claim 1 in connection with Hoffman and Mayes, every element of claim 10 is not taught or suggested by Hoffman and Mayes. Therefore, claim 10 patentably distinguishes over Hoffman and Mayes, and reconsideration and withdrawal of the rejection of claim 10 under 35 U.S.C. §103(a) is respectfully requested. Claims 11-20 depend from claim 10 and are therefore allowable for at least the same reasons.

General Comments on Dependent Claims

Because each of the dependent claims depends from a base claim that is believed to be in condition for allowance, Applicants believe that it is unnecessary at this time to argue the further distinguishing features of all of the dependent claims. However, Applicants do not necessarily concur with the interpretation of the dependent claims as set forth in the Office Action, nor do Applicants concur that the basis for the rejection of any of the dependent claims is proper. Therefore, Applicants reserve the right to specifically address in the future the further patentability of the dependent claims not specifically addressed herein.

CONCLUSION

In view of the foregoing amendments and remarks, this application should now be in condition for allowance. A notice to this effect is respectfully requested. If the Examiner believes, after this amendment, that the application is not in condition for allowance, the Examiner is requested to call the Applicants' representative at the telephone number indicated below to discuss any outstanding issues relating to the allowability of the application.

If this response is not considered timely filed and if a request for an extension of time is otherwise absent, Applicants hereby request any necessary extension of time. If there is a fee occasioned by this response, including an extension fee, that is not covered by an enclosed check, please charge any deficiency to Deposit Account No. 23/2825 under Docket No. S1459.70129US00 from which the undersigned is authorized to draw.

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Respectfully submitted,

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